

## **CLAIMS**

### **WE CLAIM:**

1. A distributed navigation system comprising:
  - a computing device;
  - 5 program memory that includes a component-oriented application that provides a distributed navigation system comprising:
    - a User Interface component;
    - a Service Manager component;
    - a User Positioning category of components that provides a user position based on navigation sensor data, and
      - 10 a Mapping category of components that accesses a map database and places the user position on a road segment of the map database;
      - wherein the components within the navigation module are managed by the service manager to perform distributed navigation services.
- 15 2. The system of claim 1, the navigation application further comprising:
  - a Route Processing category of components that provides a route from a given starting point to a destination point, and maneuvers for the route, and
    - an Address Processing category of components that provides a list of 20 destinations.

3. The system of claim 1, further comprising:

a Traffic Service component that provides a real-time traffic data from a remote service.

5 4. The system of claim 1, further comprising:

a Messaging Services component that provides internal communication between components.

5. The system of claim 1, further comprising:

10 a Server Communication component configured to provide request and response mechanism to communicate with a server.

6. The system of claim 1, wherein the User Positioning category of components includes a GPS service component that provides GPS data.

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7. The system of claim 1, wherein the User Positioning category of components includes a Navigation Sensor component that provides navigation sensor data.

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8. The system of claim 1, wherein the Mapping category of components includes a Map Matching component that places the user position on a map database road segment.

9. The system of claim 1, wherein the Mapping category of components includes a Map Display component that draws a map having entities representing different visible objects on the screen.

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10. The system of claim 1, wherein the Mapping category of components includes a Map Data Access component that provides an interface to access the map database.

10 11. The system of claim 2, wherein the Route Processing category of components includes a Route Maneuver component that provides a route from a given starting point to a destination point, and provides maneuvers for the route.

12. The system of claim 2, wherein the Route Processing category of  
15 components includes a Route Maneuver Expansion component that expands maneuvers with detailed description of the maneuver based on a turn angle and a maneuver type.

13. The system of claim 12, wherein the Route Maneuver Expansion  
20 component is configured to associate sound files and/or bitmaps to each maneuver.

14. The system of claim 2, wherein the Route Processing category of components includes a Route Guidance component configured to guide a user on the route, and to determine if the user is on route.

5 15. The system of claim 2, wherein the Address Processing category of components includes a Custom Destinations component that provides a list of destinations stored on a server.

10 16. The system of claim 2, wherein the Address Processing category of components includes a Name Lookup component that enables a system client to perform name entries and searches on a limited name sets.

15 17. The system of claim 16, wherein the Name Lookup component includes an interface to perform next character searches.

18. The system of claim 2, wherein the Address Processing category of components includes a Name Lookup Data Access component that provides data for the Name Lookup component.

20 19. A method of providing a distributed navigation application from a computer system that supports an object oriented programming environment, the method comprising:

- providing a User Interface component;
- providing a Service Manager component;
- providing a User Positioning category of components that provides a user position based on navigation sensor data, and

5       providing a Mapping category of components that accesses a map database and places the user position on a road segment of the map database; wherein the components within the navigation module are managed by the service manager to perform distributed navigation services.

10      20.     The method of claim 19, further comprising:

- providing a Route Processing category of components that provides a route from a given starting point to a destination point, and maneuvers for the route, and
- providing an Address Processing category of components that provides a list of destinations.

15      21.     The method of claim 19, further comprising:

- providing a Traffic Service component that provides a real-time traffic data from a remote service.

20      22.     The system of claim 19, further comprising:

- providing a Messaging Services component that provides internal communication between components.

23. The system of claim 19, further comprising:  
providing a Server Communication component configured to provide request  
and response mechanism to communicate with a server, wherein the response  
5 mechanism includes techniques to process request messages.

24. The method of claim 23, wherein the techniques to process request  
messages include:

interpreting the request messages;  
10 dispatching calls to request event handlers to handle the request messages;  
preparing a response to the request messages, such that distributed  
navigation data is collected and processed; and  
transmitting the response to a client, wherein the client can process the  
received navigation data in the response into a presentable form.

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25. The method of claim 24, further comprising:

deserializing the request messages if the request message is serialized.

26. The method of claim 24, wherein interpreting the request messages  
20 includes fetching session information.

27. The method of claim 24, wherein interpreting the request messages includes invoking services.

28. The method of claim 24, wherein the event handlers include a handler  
5 to synchronize Meta-Data information.

29. The method of claim 28, wherein the Meta-Data information describes a serialization format.

10 30. The method of claim 24, further comprising:  
storing the response into a session cache.

31. The method of claim 30, wherein the event handlers include a handler to resend the response stored in the session cache.

15 32. The method of claim 24, wherein the even handlers include a handler to handle a response cancellation request.

20 33. The method of claim 24, wherein preparing a response includes serializing the response.

34. The method of claim 24, wherein preparing a response includes encrypting and compressing the response.

35. The method of claim 24, further comprising bundling responses.

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36. The method of claim 35, wherein transmitting the response includes writing the bundled responses to a channel by writing a header and a body of each response.

10 37. The method of claim 24, wherein the request messages are aggregated into a single composite request object.

38. The method of claim 24, wherein each of the request messages includes a sender identification (ID) and a time stamp.

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36. The method of claim 35, wherein the sender ID is a value representing an Internet Protocol (IP) address assigned to the client.

20 37. The method of claim 21, wherein the distributed navigation data comprises chunked data.